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CP40: FRP/CONCRETE PILES

THE NEED

CP40 is a FRP/concrete composite post, pole, or pile which matches the strength of traditional materials -- metal, wood, or concrete -- without sharing their vulnerability to corrosive factors in their site environments.

**FIGURE 1 CP40 PILES USED FOR BERTHS 20A & 20B
AND FRP BRACING FOR PIER C AT THE BROOKLYN NAVY YARD**

CP40 is a round, vertical, structural element for use in corrosive outdoor environments. Strong, corrosion-resistant marine piling (8" to 24" outside diameter, and larger) is needed in waterfront infrastructure & structures such as locks/dams, canals, docks, piers, marinas, etc. Strong, corrosion-resistant fence and sign posts (2" to 4" outside diameter) are needed for facility/property perimeters and highway applications where groundwater, shorefront, de-icing, etc. conditions rust, rot, or corrode traditional materials.

FIGURE 2 US NAVAL BASE, INGLESIDE TX. FENDERING & LOAD-BEARING APPLICATIONS, EMR FACILITY PIER

THE TECHNOLOGY

CP40 consists of three components, namely, a hollow fiberglass-reinforced-plastic (FRP) tube, a concrete core, and a durable environmentally-neutral coating. The core and tube contribute compressive and tensile strength respectively to the structural element. Since the core is expanded in the tube, sufficient bond is produced for the two materials to act in a composite manner. In brief, the core prevents crush/buckle of the tube, and the tube protects the core from corrosive factors in the environment. The durable coating serves as a redundant defense of the FRP against ultraviolet rays.

FIGURE 3 FABRICATED NEAR-SITE, HANDLED & INSTALLED USING CONVENTIONAL EQUIPMENT & TECHNIQUES

CP40 can be fabricated, handled, driven, and connected using industry standard equipment, tools, hardware, and techniques.

THE BENEFITS

CP40 has the strength required of traditional materials, but serves longer in harsh conditions such as those of the marine environment. CP40's advantages over traditional piling materials (wood, concrete, steel, aluminum) include:

- cannot rot, rust, or corrode
- not subject to marine borers and ship worm damage
- uniform piles available in any length, in any quantity
- easy to handle and drive
- electromagnetically invisible
- no hazmat
- low/no maintenance
- color available
- greatly extended service life
- reliable design loads
- off-the-shelf product with established standard performance

STATUS

By 1997 R&D goals were essentially achieved and preliminary commercialization began with a focus on demonstration type projects. Lancaster concentrated on marketing large diameter piles, primarily for marine applications where steel, aluminum or wood products are seriously deficient. Lancaster has developed extensive awareness of CP40 marine piling among buying agencies and designers of waterfront structures. Many waterfront structures have been built using CP40. Through these successful installations, Lancaster has demonstrated that the large diameter CP40 product has sufficient structural integrity to serve as both a fender pile for large vessel docks and as a load-bearing structural pile for major piers, etc. New application-specific engineering and the development of even larger outside diameter piling is ongoing. The piling market offers proven, immediate, and significant opportunities for Lancaster's CP40. To date \$4.2 million in sales have been booked and produced.

Patent protection has been achieved and is being expanded. A total of five patents have been issued and presently control the strategic intellectual property necessary for full commercialization in North America and Europe. Lancaster Composite has developed, patented, and demonstrated markets for CP40. Lancaster is now launching the full-scale commercialization of CP40 piling. Lancaster Composite is seeking a partner or partners who can join this full-scale commercialization campaign on a national and international level.

BARRIERS

Engineers are unfamiliar with the new material. Though CP40 offers many advantages over traditional piling materials, it often carries an initial price premium. Procurement is often not based on life-cycle values. For any new material to gain a large market position, it must ultimately be included in standard guide specifications and on pre-approved product lists. In 1995, Lancaster began a campaign to overcome this barrier by presenting CP40 to master specification organizations and buying agencies. To date the composite post has been specified by dozens of different agencies including, the Federal Highway Administration, the Federal Aviation Administration, the United States Navy, the U.S. Army Corps of Engineers, State Departments of Transportation and many other large using agencies such as ports. Demand exists in the U.S.A. and abroad for large quantities of CP40 posts and piles to be used on many separate structural and infrastructural projects. This large, wide-spread potential in itself constitutes a barrier to full-scale commercialization. Fortunately, since CP40 can best be made available through near-site production rather than from a central location, all that is required to overcome this barrier is the participation of a national firm, or team of firms, with existing channels to the waterfront (and foundation) markets for construction materials.

POINTS OF CONTACT

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REFERENCES

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REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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